

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE 12	PAGE OF PAGES 1 3
2. AMENDMENT/MODIFICATION NO. 21	3. EFFECTIVE DATE JUL 09 2002	4. REQUISITION/PURCHASE REQ. NO. 001790021(1F)	5. PROJECT NO. (If applicable)
6. ISSUED BY CODE	PS22-K	7. ADMINISTERED BY (If other than Item 6) CODE	PS22-K

Procurement Office  
George C. Marshall Space Flight Center  
National Aeronautics and Space Administration  
Marshall Space Flight Center, AL 35812

Marianne Campbell  
256-544-6496  
Marianne.campbell@msfc.nasa.gov  
AUTOMATED INVOICE PAYMENT INFORMATION: (256) 544-5566

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code)	(X)	9A. AMENDMENT OF SOLICITATION NO.
Hernandez Engineering Inc. 16055 Space Center Boulevard, Suite 725 Houston, TX 77062		9B. DATED (SEE ITEM 11)
		10A. MODIFICATION OF CONTRACT/ORDER NO.
	X	NAS8-00179
CODE 2Y303 FACILITY CODE		10B. DATED (SEE ITEM 13) 10/01/00

## 11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning \_\_\_\_ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

N/A

## 13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 43.103(a)(3) and Mutual Agreement Between Both Parties
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 3 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

	Negotiated Est. Cost	Potential Award Fee	Earned Metric Eval. Fee	Earned Performance Eval. Fee	Contract Value	Total Sum Alloted
Previous	\$13,938,122.00	\$453,763.00	\$159,715.00	\$228,960.00	\$14,780,560.00	\$13,836,117.00
This Mod	(\$64,174.00)	(\$3,947.00)	\$0.00	\$0.00	(\$68,121.00)	\$0.00
New Total	\$13,873,948.00	\$449,816.00	\$159,715.00	\$228,960.00	\$14,712,439.00	\$13,836,117.00

See page 2 for description.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Marianne Campbell Contracting Officer		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY	16C. DATE SIGNED JUL 09 2002
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

The purpose of this modification is to:

- Delete Paragraph 12.0 from Attachment J-1, PERFORMANCE WORK STATEMENT
- Delete WBS 12 from Attachment D, WORK BREAKDOWN STRUCTURE
- Delete and replace Attachment J-4B METRICS EVALUATION PLAN to amend the Negotiated Composite Labor Rate (CDLR).

The foregoing action is further implemented by the following changes. All changes are marked in **BOLD**.

1. Clause B.2 CONTRACT COST AND FEES paragraphs (b) and (c) are deleted in their entirety and the following is substituted in lieu thereof:

**B.2 CONTRACT COST AND FEES**

"(b) A summary of the estimated cost and fees for the performance of work under this contract is as follows:

	<u>Previous Amount</u>	<u>Adjusted this Mod</u>	<u>New Total</u>
<b><u>Estimated Cost</u></b>	\$13,938,122.00	<b>(\$64,174.00)</b>	<b>\$13,873,948.00</b>
<b><u>Potential Award Fee(s)</u></b>	\$453,763.00	<b>(\$3,947.00)</b>	<b>\$449,816.00</b>
<b><u>Potential Performance Evaluation Fee (60%)</u></b>	\$272,258.00	<b>(\$2,368.00)</b>	<b>\$269,890.00</b>
<b><u>Potential Metrics Evaluation Fee 40%</u></b>	\$181,505.00	<b>(\$1,579.00)</b>	<b>\$179,926.00</b>
<b>Earned Performance Evaluation Fee</b>	\$228,960.00	\$0.00	\$228,960.00
<b>Earned Metric Evaluation Fee</b>	<u>\$159,715.00</u>	<u>\$0.00</u>	<u>\$159,715.00</u>
<b>Total</b>	14,780,560.00	<b>(\$68,121.00)</b>	<b>\$14,712,439.00</b>

(c) Estimated cost and fees applicable to each option period are set forth below:

<u>Option No.</u>	<u>Period Covered</u>	<u>Estimated Cost</u>	<u>Potential Performance Evaluation Fee</u>	<u>Potential Metrics Evaluation Fee</u>	<u>Total Option Value</u>
1	10/01/01--09/30/02	<b>\$7,175,653.00</b>	<b>\$264,702.00</b>	<b>\$176,467.00</b>	<b>\$7,616,822.00</b>
2	10/01/02--09/30/03	<b>\$7,690,761.00</b>	<b>\$282,420.00</b>	<b>\$188,279.00</b>	<b>\$8,161,460.00</b>
3	10/01/03--09/30/04	<b>\$7,918,916.00</b>	<b>\$290,796.00</b>	<b>\$193,863.00</b>	<b>\$8,403,575.00</b>
4	10/01/04--09/30/05	<b>\$8,010,012.00</b>	<b>\$294,139.00</b>	<b>\$196,092.00</b>	<b>\$8,500,243.00"</b>

2. Clause B.3 AWARD FEE FOR SERVICE CONTRACTS (1852.216-76) (MAR 1998) Paragraph (e) is deleted in its entirety and the following is substituted in lieu thereof:

B.3 AWARD FEE FOR SERVICE CONTRACTS (1852.216-76) (MAR 1998)

"(e) The amount of award fee which can be awarded in each evaluation period is limited to the amounts set forth in the following tables. Award fee which is not earned in an evaluation period cannot be reallocated to future evaluation periods.

	Award Fee Period	<u>Original</u> <u>Amount</u> <u>Available</u>	<u>Performance</u> <u>Eval. Fee Earned</u>	<u>Mod No.</u>
1	10/01/00 - 03/31/01	\$ 117,545.00	\$ 111,079.00	Mod 07
2	04/01/01 - 09/30/01	\$ 122,030.00	\$ 117,881.00	Mod 15
3	10/01/01 - 09/30/02	\$ 264,702.00		
4	10/01/02 - 09/30/03	\$ 282,420.00		
5	10/01/03 - 09/30/04	\$ 290,796.00		
6	10/01/04 - 09/30/05	\$ 294,139.00		
	<b>Total</b>	\$ 1,371,632.00	\$ 228,960.00	

2. Summary of Potential and Earned Metrics Evaluation Fee

	Award Fee Period	<u>Original</u> <u>Amount</u> <u>Available</u>	<u>Metrics</u> <u>Eval. Fee Earned</u>	<u>Mod No.</u>
1	10/01/00 - 03/31/01	\$ 78,362.00	\$ 78,362.00	Mod 07
2	04/01/01 - 09/30/01	\$ 81,353.00	\$ 81,353.00	Mod 15
3	10/01/01 - 09/30/02	\$ 176,467.00		
4	10/01/02 - 09/30/03	\$ 188,279.00		
5	10/01/03 - 09/30/04	\$ 193,863.00		
6	10/01/04 - 09/30/05	\$ 196,092.00		
	<b>Total</b>	\$ 914,416.00	\$ 159,715.00	

4. Attachment J-1, PERFORMANCE WORK STATEMENT, paragraph 12, is deleted in its entirety and the following Attachment J-1, PERFORMANCE WORK STATEMENT is substituted in lieu thereof.

5. Attachment J-4 Section B, METRICS EVALUATION PLAN (MEP) is deleted in its entirety and the following Attachment J-4 Section B, METRICS EVALUATION PLAN (MEP) is substituted in lieu thereof to amend the Negotiated Composite Direct Labor Rate (CDLR).

ATTACHMENT J-1

PERFORMANCE WORK STATEMENT

MSFC SAFETY & MISSION ASSURANCE MISSION SERVICES

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"ATTACHMENT J-1

PERFORMANCE WORK STATEMENT

1.0

MISSION

The MSFC Team has accepted the goal to seek to establish the Center as number one in safety within NASA. Commitment to the core values of the Center's people and customers allows for the establishment of a highly skilled, diverse, and motivated workforce committed to safety. Working in a creative and productive environment in support of cutting-edge systems and technology development, the Center employs unique and innovative management techniques to improve safety of the public, the astronauts and pilots, the NASA workforce and high-value equipment and property. The Safety and Mission Assurance Office is committed as a part of MSFC, to preventing human injury and occupational illnesses while developing and maintaining a world class safety program. The S&MA Service Contractor shall fully support these endeavors and demonstrate the same type of commitment to a world class safety program.

The Contractor shall provide the necessary management, personnel, equipment, and supplies (not otherwise provided by the Government) required to provide mission services associated with the planning, implementation, and assessment of safety, reliability, maintainability, quality assurance, and risk management programs for the Marshall Space Flight Center Safety and Mission Assurance Office. The mission services tasks associated with each of these programs are elaborated in this Performance Work Statement (PWS). See Appendix E for a list of the current MSFC Programs and Projects requiring Safety and Mission Assurance support.

The Contractor shall perform surveillance of assigned MSFC in-house and contracted design, manufacturing, and testing activities, for both hardware and software, to assess compliance with NASA MSFC Safety, Reliability, Maintainability, and Quality Assurance (SRM&QA) policies, requirements, and controls. The Contractor shall assure that management assessment information is provided in a timely manner to the MSFC S&MA Office to support the decision-making process regarding open problems, hazards, and risks pertaining to accomplishing MSFC's mission. This will include

operation and maintenance of the S&MA Management Information Center (MIC). The tasks described in this Performance Work Statement shall be performed principally in the MSFC locale; however, occasional travel to contractor facilities, NASA Headquarters, and other NASA installations may be required. The Contractor is required to provide one senior Quality Assurance specialist at Stanford University to support MSFC S&MA surveillance and inspection for the Gravity Probe B spacecraft. This task is scheduled to end March 30, 2002.

This Performance Work Statement as set forth is unclassified, and proposals should be submitted accordingly. However, some Contractor personnel may require access to classified documents; therefore, the selected Contractor must possess or be able to acquire a Facility Security Clearance. Security clearance, for those persons required to have such, will be obtained in accordance with the Industrial Security Manual for Safeguarding Classified Information, DOD Manual 5220.22. Contractor personnel working at MSFC must comply with pertinent MSFC security regulations.

The numbering system employed in this Performance Work Statement (PWS) corresponds to the numbering system employed in the Work Breakdown Structure (WBS) (Appendix D) that depicts this effort, however, in some sections, it is detailed to a lower level. Each PWS task describes the correspondingly numbered WBS item.

## 2.0

### MANAGEMENT

The Contractor shall provide administrative and program management for effective direction and control of this contract. The Contractor's plan and approach for providing such management shall be documented in a Management Plan which will be prepared in accordance with DRD 875MA-001. The Contractor shall develop management information systems which provide a means for monitoring and measuring performance and which encompass planning, scheduling, progress, and completion of tasks or projects. A Monthly Financial Management Report shall be provided in accordance with DRD 875MA-002. Progress Reports shall be submitted in accordance with DRD 875MA-003. An On-Site Employee Location Listing shall be submitted in accordance with DRD 875CD-001.

## 2.1 Project Management

The Contractor shall provide planning, coordination, and surveillance of overall activities to assure disciplined performance of work and timely application of the resources necessary for completion of all tasks described in this Performance Work Statement.

## 2.2 Property Management

The Contractor shall comply with the MSFC Property Management Manual (Directives, MWI 4520.1 - Receiving, MWI 4220.1 - Office Furniture and Furnishings Services, MWI 4200.1 - Equipment Control, MWI 4300.1 - Disposal Turn Ins/Reutilization Screening, MWI 4500.1 - Supply Management: Storage and Issue, MWI 4520.2 - Use of the Procurement Discrepancy Tracking System (PDTs), MPG 4000.2 - Property Management), Part 45 of the Federal Acquisition Regulation, and Part 18-45 of the NASA Federal Acquisition Regulation Supplement for acquisition and accountability of materials and equipment. The Contractor shall implement an inventory control system for all non-capitalized property and equipment. A Government Property Management Plan shall be provided, maintained, and implemented in accordance with DRD 875LS-001.

## 2.3 Occupational Safety and Health

The Contractor shall be responsible for accomplishing the required industrial/occupational safety functions in compliance with the safety requirements contained in the safety documents referenced in DRD 875SA-001. The contractor shall establish and implement a safety, health, and environmental program that incorporates the following elements as applicable to work performed under the contract (documented in the On-site Safety and Health Plan in accordance with DRD 875SA-001).

- a. Management commitment and employee involvement in the safety and health program.
  1. Document worksite safety policy.
  2. Establish and communicate clear safety and health goals.
  3. Full management involvement in implementation of the safety and health program.
  4. Full employee involvement in the safety and health program.
  5. Assign and communicate responsibilities.
  6. Provide authority and resources.
  7. Provide or allow access to professional safety and health staff.
  8. Hold accountable management and employees.
  9. Conduct annual self evaluation reviews.

- b. System and worksite hazard analysis.
  - 1. Complete and update baseline surveys.
  - 2. Perform analysis of new work.
  - 3. Perform hazard analysis of all jobs [i.e., job hazard analysis (JHA)].
  - 4. Conduct safety and environmental inspections (i.e., at a minimum, one per supervisor per month).
  - 5. Establish and maintain a hazard reporting system (MSFC's Safety Concerns Reporting System (SCRS) may be used).
  - 6. Investigate all mishaps and "close calls," and correct hazards.
  - 7. Analyze all injury, illness, and "close calls" trend data.
- c. Hazard prevention and control.
  - 1. Establish a hazard identification process and measurements.
  - 2. Conduct facility and equipment maintenance.
  - 3. Conduct emergency preparedness planning and training (On-site contractors may use MPG 1040.3).
  - 4. Establish emergency medical care program.
- d. Safety and health training.
  - 1. Train employees to identify, understand, and prevent hazards, and certify employee qualifications to perform tasks when required by OSHA Code of Federal Regulations and MWI 3410.1.
  - 2. Train supervisors to control hazards.
  - 3. Train managers to understand safety, health and environmental issues.
- e. Environmental compliance.
  - 1. Establish and maintain a process to procure green chemicals as required by Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition" for current hazardous substance usage.
  - 2. Establish and maintain procedures for reducing, reusing, and recycling of hazardous and toxic substances prior to disposal as required by the Pollution Prevention Act.
  - 3. Establish and maintain procedures for minimizing stormwater pollution from entering the environment through inside storage, engineering controls, inspection, etc.
  - 4. Establish and maintain procedures for ensuring that permits required by the Clean Air and Clean Water Acts are obtained for equipment and processes and

that inspections, recordkeeping, and tests are performed.

5. Establish and maintain procedures for disposing of hazardous waste, controlled waste, and/or wastewater as allowed by MSFC permits.

Mishaps shall be reported to the MSFC S&MA Office in accordance with DRD 875SA-002, "Mishaps and Safety Statistics Reports."

#### 2.4 Working Group Support, Information Exchange, and Support for Implementation of New or Revised Requirements

The Contractor shall provide the following for each of the SRM&QA functions:

- a. Participation in working groups.
- b. Information sharing or exchange with NASA Headquarters, other NASA Centers, and MSFC element contractors.
- c. Review of and preparation of comments for drafts of new requirements documents or proposed revisions to existing requirements documents.
- d. Participation in MSFC S&MA efforts to have MSFC Project Offices and their associated contractors implement new or revised requirements.

#### 2.5 Personnel Training and Certification

Certification is required for personnel engaged in training responsibilities, processes and potentially hazardous operations during fabrication, assembly, and inspection, of flight or flight-associated hardware and buildup, and operations and maintenance of the test facilities. Personnel certification, re-certification shall be accomplished, maintained in accordance with the requirements of MWI 3410.1 "Personnel Certification Program," NPG 8715.3 "NASA Safety Manual"; and applicable codes for welding, inspection, and Nondestructive Evaluation (NDE) of structural and pressure pipe welding. A Personnel Training and Certification Plan shall be provided in accordance with DRD 875MA-009.

#### 3.0 SYSTEMS SAFETY ENGINEERING PROGRAMS

- 3.1 Develop and utilize any tools needed to assure that all applicable system safety requirements (e.g., Agency, Center, Program/Project, etc.) are identified for MSFC programs and projects. These should include, but not

be limited to fault tree analysis, logic trees, hazard analysis trending and data search, and any other systems needed to analyze system safety information. The results of these tools should be provided to MSFC S&MA personnel with appropriate recommendations.

- 3.2 Assess program or project documentation (e.g., Contractor PWS, Data Requirements Documents, System Requirements Document, Contract End Item (CEI), Requirements Verification Compliance (RVC), procedures, etc.) to assure that all applicable safety requirements are included.
- 3.3 For in-house designs perform and/or assess and for out-of-house designs assess trade studies relative to design, Operations, or mission events to assure compliance with safety requirements and to assure safety risks are adequately identified, characterized, and mitigated.
- 3.4 For in-house designs prepare and/or assess and for out-of-house designs assess Safety Plans to assure compliance with applicable Agency, Center and Program safety requirements. Assess Project Plans to assure that safety is properly considered.
- 3.5 For in-house designs perform and/or assess and for out-of-house designs assess hazard analyses to assure that: (a) all hazards are identified and the associated risks properly characterized; (b) hazard controls satisfy applicable safety requirements and adequately mitigate safety risks; (c) safety verification requirements are clearly identified and adequate, including the clear definition of verification pass/fail criteria; and (d) the safety verification status is properly maintained in a closed loop accounting system.
- 3.6 Assess program or project verification plans and verification requirements (e.g., Verification Plans, RVC documents, etc.) to assure safety verification requirements are properly included. Assess test and operating procedures to assure compliance with safety controls and safety verification requirements. Assess safety verification compliance data to assure it clearly demonstrates compliance with the safety verification requirements and parent safety requirement.
- 3.7 Participate in (including making presentations as required) milestone reviews, safety reviews and readiness reviews to assure compliance with applicable safety requirements. Evaluate documentation and data for technical interchange meetings, design milestone reviews (e.g., PRR, PDR, CDR, DCR), safety reviews, and

- readiness reviews (e.g., Pre-Ship Review, FRR, PAR) to assure compliance with applicable safety requirements and consideration of safety risks.
- 3.8 Assess proposed changes, deviations, and waivers to project documentation to assure compliance with safety requirements. Evaluate impacts to safety analyses, and effects on program or project risk.
- 3.9 Provide systems safety expertise for program and project Boards such as Configuration Control Boards, Problem Review Boards, Discipline Control Boards, Program Control Boards, etc.
- 3.10 Identify any adverse safety trends and promptly notify MSFC S&MA.
- 3.11 Provide real-time safety assessments during launch countdowns and missions.
- 3.12 Perform safety assessments of any issues which involve one or more of the following:
- a. Operation or performance outside the expected performance range of parameters or which has not previously been experienced.
  - b. Discrepancies or nonconformances which affect:
    - 1. Configuration
    - 2. Certification
    - 3. Mission success
    - 4. Safety critical functions
    - 5. Weight in excess of two pounds (equivalent performances to orbit)
  - c. Adverse problem trends
  - d. Discrepancies or nonconformances which the operator determines requires design element analysis or assistance for resolution.
  - e. Unexplained anomalies or events.
  - f. Limit hardware life.
  - g. Restrict hardware or software use.
  - h. Affect hazard control.
  - i. Affect flight or ground operation procedures that are controlled by the Government.
  - j. Change software or hardware configurations that are controlled by the Government.
  - k. Allow use of hardware that does not meet performance specifications, exceeds certification limits, or surpasses time, age, cycle life limits (waivers/exceptions).
  - l. Affect critical hardware manufacture or repair processes.
- 3.13 Provide support to the MSFC Payload Safety Readiness Review Board (PSRRB) and Space Shuttle Systems Safety Review Panel (SSRP) such as documentation distribution and review, board establishment and communication,

- executive secretary function, meeting action item tracking, and records retention. Perform independent "Checklist Reviews" of Safety Compliance Data Packages.
- 3.14 Develop and maintain metrics regarding the safety performance of MSFC programs and projects.
- 4.0 INDUSTRIAL SAFETY PROGRAM
- 4.1 Conduct safety compliance and hazardous operations inspection of MSFC facilities including research and development test facilities, laboratories, and industrial facilities and equipment (machine shops and tools, welding and material handling equipment, boilers, and offices).
- 4.2 Conduct site safety compliance inspection of MSFC construction sites.
- 4.3 Perform safety engineering evaluation of preliminary engineering reports, feasibility studies, and facility and equipment drawings and specifications to assure compliance with applicable codes and other MSFC safety program requirements.
- 4.4 Perform hazard analyses for ground-based activities in the MSFC locale when directed and evaluate ground safety analyses, including hazards analyses performed by others. Use state-of-the-art techniques such as safety checklists, fault tree analyses, and logic tree assessments to assure that hazards analyses are thorough and complete.
- 4.5 Evaluate test, checkout, and operating procedures for MSFC facilities and equipment to assure procedures will result in safe operations.
- 4.6 Evaluate written plans and procedures for program critical hardware (PCH) handling and transportation. Develop processes, perform engineering analysis for lifting equipment, and monitor implementation of, NASA Safety Standard for Lifting Devices and Equipment (NSS 1740.9) and participate in PCH moves as an expert advisor.
- 4.7 Support self-assessment of and survey all aspects of safety programs at MSFC including employee audits.
- 4.8 Provide required expertise/support for mishap investigations and other safety technical issues.
- 4.9 Participate as an expert advisor in Operational Readiness Inspections (ORI's) and Safety Review Teams to assess safety of test articles, facilities, interfaces, and test operations.

- 4.10 Identify and recommend improvements to the MSFC safety training program. Perform training duties for collateral duty employee training and employee general safety training on a continuing recurring basis. Execute proficiency tests for cranes, forklifts, aerial lifts, etc. for MSFC personnel.
- 4.11 Develop, utilize, and maintain any tools needed to assure that all applicable industrial safety requirements are identified for MSFC. These should include, but not be limited to; safety tracking systems, such as MSFC Hazardous Operations Personnel Certification (CERTRAK) (see paragraph 6.4), Construction Hazards, Employee Records of Unsafe Conditions (SCRS - Safety Concerns Reporting System), Facility Hazards (HAZTRAK), Safety Search, Mishap Reporting, Safety Bulletins, Hazard Analysis, Building Managers, ORI tracking systems, and Certified Cranes that meet the criteria for lifting PCH; and any other systems needed to track and analyze industrial safety information. The results of these tools should be provided to MSFC S&MA personnel with appropriate recommendations.
- 4.12 Maintain a Safety Standards Library.
- 4.13 Perform safety engineering assessments of explosives siting problems using methods of the NASA Explosives Safety Standard. Methodology will include definition of maximum credible events, quantitative estimation of overpressure, fragmentation, thermal effects, and destructive potential at potential exposures, and preparation of risk assessment summaries.
- 4.14 Develop processes for, and monitor implementation of new NASA and OSHA safety standards and requirements.
- 4.15 Participate in pre-construction meetings to inform contractors of safety requirements at MSFC.
- 4.16 The Contractor shall provide Safety Engineer and Safety Specialist expertise in support of MSFC Technology Evaluation Department (Test Areas) and Propulsion Research Center operations.
- 4.17 Provide expertise to help MSFC obtain and maintain certification in the OSHA Voluntary Protection Program.
- 4.18 The Contractor shall prepare, present, and/or distribute information related to industrial safety activities as requested.

5.0        RELIABILITY AND MAINTAINABILITY ENGINEERING

5.1        Systems Analysis

- 5.1.1      Prepare reliability and maintainability plans for MSFC developed designs and evaluate reliability and maintainability plans submitted by contractors. Assure that reliability and maintainability requirements are consistent with MSFC S&MA and project management direction. Support the development of FMEA/CIL's and their groundrules for in-house designs and support the assessment of FMEA/CIL's and their groundrules for out-of-house designs.
- 5.1.2      Evaluate changes, out-of-family conditions, material reviews, and deviations for impact to FMEA's and CIL's.
- 5.1.3      Evaluate project documents related to reliability and maintainability to assure consistency and adequacy with overall project requirements.
- 5.1.4      Evaluate OMRSD's and implementing OMI's to assure that reliability and maintainability requirements are adequately addressed and implemented.
- 5.1.5      Participate in project milestone reviews (PRR's, PDR's, CDR's, DCR'S, FRR's, etc.) for the purpose of evaluating the incorporation of reliability and maintainability requirements throughout the life cycle of a project (e.g., design, production, testing, and operations).
- 5.1.6      Prepare reliability assessments, using reliability data bases, for each mission, vehicle, and other equipment in support of preflight assessment reviews and flight readiness milestone reviews.
- 5.1.7      Perform design trade studies, evaluate contractor prepared trade studies, and provide reliability and maintainability assessments.
- 5.1.8      Evaluate contractor provided reliability and maintainability analyses, to verify the validity of the analyses and that the analyses have been performed in accordance with requirements.
- 5.1.9      Perform ad hoc numerical reliability and maintainability analyses using appropriate analytical methods and models without necessarily receiving detailed technical guidance from MSFC. The analytical methods may include, but not be limited to, classical probability density functions, reliability and maintainability models, Monte Carlo simulation models, etc.

5.1.10 Develop and/or evaluate FMEA's and CIL's for compliance with requirements.

5.1.11 Develop and utilize any tools needed to assure that all applicable reliability and maintainability requirements are identified for MSFC programs and projects. These should include, but not be limited to FMEA/CIL information analysis, reliability trending and assessments, maintainability trending and assessments, and any other systems needed to analyze reliability and maintainability information. The results of these tools should be provided to MSFC S&MA personnel with appropriate recommendations.

5.2 Probabilistic Risk Assessment (PRA)

Perform probabilistic risk assessments. Develop tools and techniques to assess probabilistic risk assessments. The contractor shall be able to perform PRAs as required on MSFC programs and projects. Specific tasking will include, but not be limited to reliability engineering tasks related to the NASA Headquarters initiative to develop an overall Shuttle Program Risk Model. This will include data collection related to MSFC elements (Space Shuttle Main Engine, Solid Rocket Booster, Reusable Solid Rocket Motor, and External Tank), risk model selection and risk analysis of these elements, utilization of the selected risk model(s) to be integrated into the overall Shuttle Program Model, simulation of risk scenarios using available software packages, and an overall report on the data, methods/models, and results.

5.3 Hardware/Software Assessments

5.3.1 Evaluate in-house and contractor methods for identification and control of limited life items. Verify, through assessments, that sufficient remaining life of equipment is available for accomplishing the mission objectives. Verify that life limits of common hardware are consistent.

5.3.2 Evaluate engineering and programmatic changes such as ECR's, ECP's, PCP's and SCN's for reliability and maintainability impact.

5.3.3 Evaluate in-house and contractor provided FMEA analyses of software design to assure software properly responds to critical failure modes as identified by the FMEA/CIL documents (i.e., fault detection, isolation, switching, etc.).

#### 5.4 ALERT Program Maintenance

5.4.1 The Contractor shall receive ALERT's from MSFC S&MA and shall enter them into the ALERT database.

5.4.2 The Contractor shall also distribute ALERTS to MSFC actionees for review and disposition, track the status of the reviews, enter the results of the reviews in the ALERT database, and transmit the results of the reviews to the organizations identified in MWI 1280.5. The ALERT database shall allow tracking the status of ALERT's by project as well as by ALERT actionee. The Contractor shall ensure that the ALERT data is available real-time to users.

5.4.3 Evaluate closure rationale of out-of-family ALERTS.

#### 5.5 Problem Assessment Center (PAC)

The Contractor shall operate the MSFC PAC in strict compliance with the MSFC PAC Operations Plan (see paragraph 5.5.1) and supplementary guidance provided by the COTR. In executing this task, the Contractor shall process incoming problem reports, coordinate the activities of the MSFC Problem Assessment System(PAS) (which provides the process by which MSFC project management and technical organizations review and close problem reports), provide official MSFC problem report data to authorized organizations and personnel, and operate and maintain (i.e., keep data current) the MSFC PRACA database.

##### 5.5.1 Problem Assessment Center Operations Plan

The Contractor shall maintain and implement the Operations Plan for the MSFC PAC in accordance with DRD 875MA-006. The plan shall describe, in detail, the PAC activities necessary to fulfill the problem reporting requirements for each of the MSFC managed projects for which problem reporting is required.

##### 5.5.2 Problem Report Processing

The Contractor will receive problem reports (i.e., initial reports, updates, and recommended closures) directly from hardware/software contractors via mail, courier, facsimile machine, or direct electronic transfer (i.e., the hardware/software contractor's computer furnishes problem report data directly to the MSFC PRACA database). The Contractor shall review the incoming problem reports for accuracy, clarity, and completeness. The Contractor shall complete the problem report data fields designated for completion by the PAC and the Design Center. For problem reports

submitted by hardware/software contractors who do not use the MSFC PRACA problem report format, the Contractor shall prepare an MSFC PRACA problem report form. The Contractor shall screen the incoming problem reports to identify system level problems (system level hardware is identified in Appendix B of document NSTS08126, Space Shuttle Problem Reporting and Corrective Action System Requirements). The Contractor shall maintain a complete record of each problem report submitted to the PAC.

#### 5.5.3 Reviewing Problem Reports

The Contractor shall review the data for all coded fields as well as all text fields provided by the hardware/software contractor. This review shall address technical sufficiency as well as editorial acceptability. When a problem report is inaccurate, unclear, or incomplete, the Contractor shall contact the responsible hardware/software contractor by the most expeditious means and request correction, clarification, or supplementary information as warranted by the situation. Supplementary information may consist of backup technical data such as Engineering Change Request (ECR) documents, procedures, specifications, drawings, etc.

#### 5.5.4 Problem Report Records

For each incoming problem report, the Contractor shall enter the required problem report data in the MSFC PRACA database unless that data is electronically transmitted directly to the MSFC PRACA database by the hardware/software contractor. The Contractor shall maintain a record of each problem report in the MSFC PRACA database. The Contractor shall also maintain a hardcopy file containing all problem reports and their associated backup information provided by the hardware/software contractor.

#### 5.5.5 Coordinate the MSFC Problem Assessment System (PAS)

The Contractor shall coordinate the review and disposition of problem reports by the appropriate MSFC project management and technical assignees, record the actions of the assignees, and prepare and route non-concurrence letters when directed by the authorized assignees. The Contractor will coordinate the MSFC review of system level problems and record the results of the review.

#### 5.5.6 MSFC Review and Disposition

Upon receiving either initial problem reports or recommended closures from the hardware/software contractors, the Contractor shall expeditiously distribute copies of those problem reports, including backup information, to the appropriate assignees in the MSFC project offices, and the MSFC Safety and Mission Assurance Office. The Contractor shall be responsible for maintaining current knowledge of the identities of the assignees for each project for which the PAC processes problem reports. The Contractor shall track the status of the review and disposition of each problem report and, when requested, shall assist assignees in obtaining additional information from hardware/software contractors.

#### 5.5.7 Problem Review Board (PRB) Meetings

When a formal Problem Review Board (PRB) meeting is called, the Contractor shall prepare a proposed list of problem reports for review, schedule the meeting, prepare an agenda, and coordinate it with the hardware/software contractor, provide advanced notice to the participants, assure that the necessary support arrangements (i.e., meeting room reserved, telephone conference arranged, etc.) have been made, and provide problem report information packages to the MSFC assignees. In addition, the contractor shall provide an assessment of each problem report including related history, trends, thoroughness of report, and overall adequacy of investigation and recurrence controls. During the meeting, the Contractor shall administer the meeting, record and report status of action items assigned by the PRB, and record the PRB's disposition of the problem reports considered. Following the meeting, the Contractor shall monitor the status of action items, update the MSFC PRACA database and hardcopy files, and prepare, secure approval for, and distribute the minutes of the meeting.

#### 5.5.8 MSFC Review of Space Shuttle System Level Problems

The Contractor shall monitor the Space Shuttle Level II Program Compliance Assurance Status System (PCASS) database to identify newly entered system level problems pertaining to the Orbiter. The Contractor shall provide these reports to the appropriate MSFC assignees and obtain their responses which will be recorded in a dedicated file and provided to the appropriate JSC organization.

#### 5.5.9 Official MSFC Problem Report Data

The Contractor shall provide official MSFC problem report data and, if requested, basic engineering assessments of the data or answers to questions regarding the data for the following:

- a. Project office sponsored flight readiness reviews as well as S&MA Office sponsored readiness reviews (i.e., CoFR, preflight assessments (PFA), Preflight Assessment Reviews).
- b. Daily electronic updates for the Level II PCASS problem report database.
- c. Notification to the appropriate JSC organization of newly reported system level problems submitted by MSFC project hardware/software contractors.
- d. Quarterly Open Problem Lists provided in fulfillment of the requirements of DRD 875MA-007.
- e. Monthly Newly Opened/Closed Problem Report Summary in fulfillment of the requirements of DRD 875MA-008.
- f. Requests from NASA MSFC Civil Service organizations.
- g. Requests from the Huntsville Operations Support Center (HOSC) during mission support operations.
- h. Requests from other organizations upon direction from the COTR.

#### 5.5.10 Support for the Huntsville Operations Support Center (HOSC)

The Contractor will station assessment engineers at the Problem Assessment Center (PAC) during Flight Readiness Firings (FRF), Count Down Demonstration Tests (CDDT), and mission launches (beginning with tanking at approximately T-7 hours and continuing regularly or intermittently through completion of payload missions for which there are PAC maintained databases). At the PAC, the assessment engineers will respond to requests from the HOSC for problem information contained in the MSFC PRACA database. These requests will require extraction of problem data, structured queries of the database to produce information about groups of problems, and assessment and basic engineering analysis by assessment engineers to answer specific questions. The Contractor will notify the appropriate Program/Project S&MA representative if open problems are received which require disposition prior to launch.

If necessary, the Contractor will support a PRB meeting as described in 5.5.7.

5.5.11 Problem Trending

The Contractor shall conduct ongoing statistical analyses and engineering assessments of problem trends. Problem trends may be prepared for any MSFC Project (Payloads, or Space Shuttle elements) if warranted. Contractor format is acceptable.

6.0 QUALITY ASSURANCE

6.1 Systems

6.1.1 The Contractor shall prepare, evaluate and, provide assessments of in-house and contracted quality related contractual documentation (i.e., Hardware and Software Quality Assurance (QA) Plans) including implementation instructions and procedures for MSFC QA policies and directives.

6.1.2 The Contractor shall perform periodic reviews and assessments of in-house and contracted QA instructions for compliance with NASA policy, Safety and Mission Assurance (S&MA) Office Charter, and the MSFC ISO 9000 Quality System.

6.1.3 The Contractor shall provide Quality Engineering (QE) expertise for the preparation, evaluation, and assessment of in-house and contractual documentation relative to processes (i.e., electrical, electronic, materials, and non-destructive evaluation) encountered during the manufacturing, inspection, and test phases of projects.

6.1.4 The Contractor shall provide expertise to support the continued ISO 9000 registration at MSFC including, but not limited to, training of MSFC employees on ISO 9000, implementation plan maintenance, procedure preparation, progress monitoring, and internal audit support. The Contractor shall give advice/consultation on matters pertaining to interpretation of the ISO 9000 standard (to individual organizations as well as the MSFC Management Representative and the Implementation/Maintenance team). The Contractor shall support the Center's ISO Implementation/Maintenance team. The Contractor shall assist in Corrective Action follow-up for external and internal Audits/Surveillances. The contractor shall participate in and support Document Control Panel/Board activity for review, evaluation, and disposition of S&MA controlled documents. This activity includes the review of Organizational Issuance

(OI) and related external documents under review by Center Document Control Boards (DCB's).

- 6.1.5 The Contractor shall participate in MSFC program, contractor, supplier, or other Government milestone reviews (i.e., PAR's, PRR's, PDR's, CDR's, DCR's, FRR's, TRR's, etc.) to evaluate the incorporation of quality assurance and certification requirements in decisions affecting design, safety, production, testing, and operation.
- 6.1.6 Develop and utilize any tools needed to assure that all applicable quality assurance requirements are identified for MSFC programs and projects. These should include, but not be limited to quality information analysis (including workmanship standards, specifications, procedures and documentation quality control), quality data trending and assessments, as built configuration databases, and any other systems needed to analyze quality assurance information. The results of these tools should be provided to MSFC S&MA personnel with appropriate recommendations.

## 6.2 Process and Product Assurance

- 6.2.1 The Contractor shall prepare and evaluate workmanship standards, specifications, procedures, and control documentation for in-house and contracted processes and purchases, utilizing the Procurement Discrepancy Tracking System (PDTs) as appropriate, used throughout all phases of the hardware and software development cycle.
- 6.2.2 The Contractor shall prepare and evaluate in-house inspection criteria for safety critical hardware/software characteristics and other requested characteristics. They shall also evaluate and provide written assessments on other MSFC contractor or Government Agency inspection criteria and implementation of inspections.
- 6.2.3 The Contractor shall provide Engineering Change Proposal (ECP) support to S&MA Configuration Control Board (CCB) members. The support provided shall consist of logging, tracking, and distributing ECP's for S&MA review, response integration, and presenting the integrated assessments to CCB's. The Contractor shall also provide support as change package engineers (CPE) as assigned.

- 6.2.4 The Contractor shall provide the expertise to evaluate in-house and contractual waivers and deviations for compliance with stated QA, certification requirements, standards, and policies.
- 6.2.5 The Contractor shall provide QE expertise to ensure the inspectability of in-house designs by performing drawing and procurement documentation review.
- 6.2.6 The Contractor shall provide the expertise to perform and evaluate trade studies relative to design, fabrication, inspection, testing, and operations.
- 6.2.7 The Contractor shall participate in the development and implementation of Quality training programs.
- 6.2.8 The Contractor shall prepare, evaluate, and maintain guidelines, checklists, and plans to be used in support of S&MA participation in audits of MSFC internal organizations, MSFC vendors and suppliers, and other Government Agencies and NASA Engineering and Quality Audits (NEQA). The Contractor shall maintain a status of all S&MA action items resulting from audits to ensure compliance with MSFC S&MA policies and procedures. The Contractor shall provide support to S&MA, auditors, and auditees by assisting in scheduling audits, tracking and follow-up of findings, and preparation and distribution of final reports. The Contractor shall maintain a system for retention of quality records associated with audits.
- 6.2.9 The Contractor shall evaluate test results versus verification requirements including the disposition of test anomalies and discrepancies for adequacy. The Contractor shall maintain the necessary certification records, files, and hardware certification status to meet project and S&MA needs.
- 6.2.10 The Contractor shall provide Quality Assurance expertise in support of MSFC Technology Evaluation Department (Test Areas) and other testing activities as required. The Contractor shall also provide Quality Assurance expertise in support of S&MA inspection activities.
- 6.2.11 The Contractor shall provide Quality Assurance personnel at Stanford for Gravity Probe B. This tasking is scheduled to end on March 30, 2002.
- 6.3 Problem Analysis
- 6.3.1 The Contractor shall, as required, advise MRB members and recommend corrective action to improve product quality. The Contractor shall also participate in the

construction of trending charts and analyses on MSFC contractor and in-house efforts, and shall provide recommendations to S&MA engineers and managers on adverse MSFC contractor and in-house trends.

6.3.2 The Contractor shall participate in problem and failure investigations to determine root cause and recommend corrective action.

6.3.3 The contractor shall administer the MSFC Corrective/Preventive Action System. It shall be operated in compliance with MPG 1280.4, MSFC Corrective Action System; MPG 1280.5, MSFC Preventive Action System; and attendant MSFC work instructions. The Contractor shall screen incoming potential recurrence control action requests (RCAR's); record and track problem and preventive action status; coordinate MSFC review and disposition of RCAR's; provide official MSFC report data to authorized organizations and personnel; perform trending on related potential and screened RCAR's by failure mode and cause; and operate and maintain the MSFC CAS database. The Contractor will provide support for maintaining associated Safety and Mission Assurance (S&MA) organizational work instructions current with MSFC procedures and guidelines.

6.4 Personnel Certification Administration  
The Contractor shall support the administration of the MSFC Personnel Certification Program in compliance with MWI 3410.1, Personnel Certification Program. The Contractor shall maintain a database system to record personnel certifications for MSFC and on-site contractor personnel. The Contractor shall screen certification packages for compliance with procedures and coordinate the review of the packages with the applicable MSFC Certifying Officer.

7.0 S&MA MANAGEMENT INFORMATION

7.1 The Contractor shall operate and manage an S&MA Management Information Center (MIC). The MIC shall be a virtual focal point for the presentation of refined, integrated S&MA data to include, but not limited to, the following areas: ALERTS, Metrics (Such as Stoplight Metrics and Mishap data), ABCSS (As-Built Configuration Status System), NCR (Nonconformance database for internal audits), UPRACA (Problem Reporting and Corrective Action), CAS (ISO9000 Corrective Action System), QSDN (ISO9000 Quality System Deficiency Notices), QualComm (ISO9000 Quality Comment System), S&MA OI's, CERTRACK (Certification Tracking System), ISO (Integrated Safety Data), SCRS (Safety

Concerns Reporting System), and any other data or results from tools specified in this PWS.

Also, administer the S&MA delegated agency data (Defense Contracts Management Command, DCMC and United States Navy, USN), which includes annual forecasts, midyear updates, and monthly data reduction (Defense Contracts Administration Reimbursable System, DCARRS).

- 7.2 Participate in the effort to implement a formal structure for S&MA management information by providing support for the purpose of planning, acquisition, development, documentation and operation of the systems.
- 7.3 Support the preparation and/or maintenance of S&MA management information documents which include Scope/Boundary, Charter, Data Dictionary/Data Directory, Strategic Plan, Organizational Issuances (OI's), and new documents as the need is determined and they are generated.
- 7.4 Using accepted and proven methodologies, assess S&MA's information needs for the present and future. Investigate alternatives for identified S&MA needs. Evaluate and recommend S&MA requirements for new system enhancements or capabilities. Present S&MA management with precise descriptions and recommendations on system alternatives and improvements.
- 7.5 Perform structured system design activities for in-house development work and for work performed by outside contractors, and make management recommendations to S&MA. MSFC S&MA will provide overview and retain final decision-making authority over all design and development activities.
- 7.6 The Contractor shall ensure that all system requirements are met. If not previously provided, the contractor shall generate complete documentation for each system. This documentation shall include, but not be limited to, requirements definition, design definition, code documentation, users guides for operations personnel as well as end users, implementation plans and operations plans. Provide user support functions for S&MA. This includes, but is not limited to training, real-time help, and information assessment and retrieval.
- 7.7 Provide computer security risk assessments of all S&MA databases and data applications in accordance with MPG 2810.1, "Security of Information Technology". Provide security plans for all major applications in accordance with DRD 875CD-002. Appoint an employee as the

Organizational Storage Media Custodian (OSMC) who will ensure that personnel, sensitive and organizational data are removed (erased) from storage media (disk) that leaves the organization.

8.0 PROJECT ASSURANCE SERVICES

Project Assurance Services shall be provided to all S&MA supported programs/projects.

8.1 S&MA Project Team Participation

8.1.1 Coordinate the Contractor S&MA activities with the S&MA project team leads to assure the proper execution of the S&MA project requirements.

8.1.2 Serve as expert advisor on SRM&QA topics for project team meetings, technical interchange meetings, problem investigation and resolution efforts, and other routine project meetings.

8.1.3 Participate in milestone reviews, data reviews, and safety reviews.

8.1.4 Provide assessments of flight readiness in support of the S&MA input to the PAR's and the Certificate of Flight Readiness for the MSFC Shuttle elements, MSFC Payloads, and Flight Projects. This includes, but is not limited to, technical issues resolution and status of S&MA flight critical documentation (COQ's, FMEA/CIL, Hazards, etc.)

8.1.5 Track action items and issues resulting from above team meetings, milestone reviews and flight readiness activities, and recommend disposition to S&MA project team leader.

8.1.6 Participate in postflight assessment of the SRB and RSRM hardware at KSC and occasionally at the Thiokol RSRM Refurbishment Facility in Utah, as requested. Prepare assessment reports and presentations. Evaluate observations for determination of items that warrant formal problem reports.

8.2 S&MA Prelaunch Assessment Center

Operate the MSFC S&MA Prelaunch Assessment Center for each Prelaunch Assessment Review (PAR), PAR Tag-up and L-2 PAR Tag-up including dry runs for ET/SRB Mate Reviews and Orbiter Rollout Reviews. This task includes scheduling, data collection, preparation and distribution of MSFC S&MA presentation materials, and data exchange with JSC, KSC, and NASA HQ. In addition,

serves as a member of the NASA PAR Data Coordinators Working Group.

### 8.3 Special Studies

Perform studies/tasks that require inputs from different projects/disciplines. Work to be performed will be specifically defined by means of technical directives issued by the Contracting Officer.

Upon receipt of a technical directive, the Contractor shall submit within 10 calendar days a proposed plan for accomplishing the study/task to the Contracting Officer for approval. Other required documentation shall be prepared and evaluated as specified in the technical directive. In the event of any exception with the provisions of the technical directive, the Contractor shall follow the procedure outlined in Section G of this contract.

### 8.4 Space Shuttle Program (SSP) Transition Support

Support SSP S&MA transition plans and their implementation to assure proper insight into operations during the contract consolidation to a single prime contract operation.

### 9.0 INDEPENDENT ASSURANCE TASKS

Use senior staff to perform independent assurance tasks in support of the Human Exploration and Development of Space (HEDS) Independent Assurance (IA) Office. Tasking will be given by the HEDS IA Office. Assessments supporting MSFC projects and programs may be requested by the MSFC S&MA Organization with the approval of the HEDS IA Office. IA tasks will include, but are not limited to the following:

- a. Track Project/Program operations and make recommendations of potential IA topics to S&MA or HEDS IA Director and Managers as appropriate.
- b. Develop and maintain IA assessment work plans.
- c. Perform assessments in accordance with approved assessment plans. Coordinate with appropriate IA team members, other organizations conducting related assessments, and program/project offices while researching issues. Report significant issues or concerns developed by the assessment immediately to managers/team members and appropriate program/project personnel.

- d. Develop report of analysis, observations and recommendations. This will include incorporation of any Program/Project responses to the IA observations.
- e. Brief observations to S&MA Managers and appropriate Program/Project personnel.
- f. Coordinate on closure of report observations and any assigned actions.

Performance of all tasking will be in accordance with the HEDS IA Implementation Plan (JSC-27456, current revision).

#### 10.0 RISK MANAGEMENT

- 10.1 The Contractor shall provide expertise to support the preparation, evaluation, and assessment of in-house and contractual program and project risk management plans. This expertise may require the Contractor to develop tools and techniques to facilitate the identification/tracking/mitigation of risks and issues that may potentially negatively impact a project or program.
- 10.2 The Contractor shall provide recommendations and advice to S&MA engineers and managers relative to risk mitigation actions to minimize or eliminate risks.
- 10.3 The Contractor's risk management experts shall take the NASA HQ supplied training and become certified as Continuous Risk Management Course instructors. Once certified, the instructors shall present the two-day Continuous Risk Management Course in-house to MSFC employees (planned a minimum six times a year).

#### 11.0 DOCUMENTATION AND REPORT SUPPORT

- 11.1 The contractor shall provide support in the development of plans, procedures, briefing material and other documents required in accomplishment of SRM&QA activities in accordance with DRD 875MA-005.
- 11.2 The contractor shall provide support to the S&MA offices with evaluations and assessments of documentation to accomplish it's mission in support of MSFC Programs and Projects. These reports shall be in accordance with DRD 875MA-004.

## "APPENDIX D

### WORK BREAKDOWN STRUCTURE

- 1.0 MISSION
- 2.0 MANAGEMENT
  - 2.1 Project Management
  - 2.2 Property Management
  - 2.3 Occupational Safety and Health
  - 2.4 Working Group Support, Etc.
  - 2.5 Personnel Training and Certification
- 3.0 SYSTEMS SAFETY ENGINEERING PROGRAM
- 4.0 INDUSTRIAL SAFETY
- 5.0. RELIABILITY AND MAINTAINABILITY ENGINEERING
  - 5.1 Systems Analysis
  - 5.2 Probabilistic Risk Assessment
  - 5.3 Hardware/Software Assessments
  - 5.4 ALERT Program Maintenance
  - 5.5 Problem Assessment Center
- 6.0 QUALITY ASSURANCE
  - 6.1 Systems
  - 6.2 Process and Product Assurance
  - 6.3 Problem Analysis
  - 6.4 Personnel Certification Administration
- 7.0. S&MA MANAGEMENT INFORMATION
- 8.0 PROJECT ASSURANCE SERVICES
  - 8.1 S&MA Project Team Participation
  - 8.2 S&MA Prelaunch Assessment
  - 8.3 Special Studies
  - 8.4 Space Shuttle Program Transition Support
- 9.0 INDEPENDENT ASSURANCE TASKS
- 10.0 RISK MANAGEMENT
- 11.0 DOCUMENTATION AND REPORT SUPPORT"

ATTACHMENT J-4  
"SECTION B

METRICS EVALUATION PLAN (MEP)

MSFC SAFETY AND MISSION ASSURANCE (S&MA) MISSION SERVICES

CONTRACT NAS8-00179

## METRICS EVALUATION PLAN (MEP)

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## A. INTRODUCTION

### 1. Purpose

This Plan provides guidelines and methodology for evaluating the performance of the S&MA Mission Services Contractor under Contract NAS8-00179, for the objective, performance-based criteria within the Schedule, Cost, and Safety Lost Time Incident (LTI) categories.

### 2. Summary

#### a. Description of Contract

The Contractor shall provide the necessary management, personnel, equipment and supplies (not otherwise provided by the Government) to perform Safety and Mission Assurance (S&MA) mission services to accomplish the following functions:

(1) Perform surveillance of assigned MSFC in-house and contracted design, manufacturing and testing activities, for both hardware and software, to assess compliance with NASA MSFC safety, reliability, maintainability and quality assurance policies, requirements and controls.

(2) Assure that management assessment information is provided in a timely manner to the MSFC S&MA Office to support the decision-making process regarding open problems, hazards and risks pertaining to accomplishing MSFC's mission.

(3) Operate the MSFC Problem Assessment Center and Management Information Center (MIC).

(4) The Contractor shall identify opportunities for improving the efficiency of task execution, including the use of innovative techniques, and present them to S&MA.

#### b. Scope of Contract

The Contractor's MSFC S&MA mission services are applicable to all assigned MSFC projects.

### 3. Fee Evaluation

In accordance with Section B of the Contract, forty percent (40%) of the total potential contract fee is available for performance of the criteria in this section. With the exception of cost performance, which will be assessed annually, performance determinations under this section (Section B/Attachment J-4) will be made semiannually concurrent with the PEB evaluations of Attachment J-4, Section A. The contractor's performance under the criteria of this section will be determined solely by the Contracting Officer's Technical Representative

(COTR) and the Contracting Officer (CO). Therefore, determinations under this section are not subject to the Performance Evaluation Board (PEB) process. To ensure excellence in S&MA mission services, this section is subject to revision during the course of this contract. However, any necessary revisions to this section will be fully coordinated with the contractor prior to the implementation period.

In order for the contractor to receive any fee under the Schedule and Safety LTI Performance criteria provisions of this MEP section, the contractor must receive an adjectival rating of "Satisfactory" or above for the concurrent evaluation period under the PEB evaluation of Section A. In order for the contractor to receive any fee under the Cost Performance criterion provisions of this MEP section, the contractor's average score for Section A for the annual period of the assessment must be an overall adjectival rating of "Good" or above.

**B. EVALUATION CRITERIA DEFINITION**

The evaluation criteria (i.e., Schedule Performance, Cost Performance, and Safety LTI Performance) specified in this section will provide the basis for determining the contractor's performance of the activities described herein and, as applicable, in the contract's Performance Work Statement (PWS). The following paragraphs define the evaluation criteria:

**1. Schedule Performance**

This criterion addresses timely completion of contract tasks under the technical direction provisions of the contract. The contractor will receive assignments with specified completion dates or milestone requirements. Success in meeting deadlines for performing these PWS tasks will be evaluated. Responsiveness to schedule changes and timely preparation, distribution, and delivery of items required by contract will also be evaluated.

Of the potential fee available in this section, sixty percent (60%) is apportioned to the Schedule Performance criterion. A performance-based approach will be used to evaluate the contractor's schedule performance, based on the elements and weightings (total to 100 percent) outlined in the list below. Description of what constitutes successful performance for fee determinations in the individual schedule elements is provided following the below list.

**Schedule Performance Elements**

1. Submittal of Data Requirements (DRs) (25 Percent)
2. Personnel Certification (20 Percent)
3. Safety Compliance and Hazardous Operations Inspections (15 Percent)
4. Real-time ALERT Availability (10 Percent)
5. Audit Action Item Status (10 Percent)
6. Recurrence Control Action Request (RCAR) Status (10 Percent). Safety and 7.
7. Environmental Inspections (10 Percent)

a. Submittal of DRs (Reference PWS 2.0, 2.3, 5.5.9, & Attch J-2)

The objective of this schedule element is to emphasize the timely delivery of the following five (5) key data requirements:

<u>DRD No.</u>	<u>Title</u>
875MA-002	Financial Management Report (533M)
875MA-003	Progress Reports
875MA-007	Quarterly Open Problem List
875MA-008	Monthly Newly Opened/Closed Problem Summary
875SA-002	Mishap and Safety Statistics Reports

The initial submission and submission frequency for each of these DRs is specified in Attachment J-2. Of the schedule performance criteria, 25 percent of the total will be apportioned for the timely delivery of these DRs. Delivery of each DR has a equal value of 5 percent of the fee potential. The MSFC Office of Primary Responsibility (OPR) will record receipt of the DRs. For the mishap reporting required by DRD No. 875SA-002, the OPR will record receipt of the mishap reporting forms.

**SUCCESSFUL PERFORMANCE (Element #1):** Successful performance of this schedule element is defined as the receipt of the above data requirements as required during the semiannual evaluation period in accordance with the Attachment J-2 submission requirements. If every required submission of a DR during the evaluation period is received per the DRD requirements, the contractor will be entitled to the full 5 percent of the fee potential for that particular DR. The maximum allowable defect rate (MADR) for the delivery of these DRs is zero days. If the contractor fails, on one occurrence, to deliver a DR to ensure receipt in accordance with the DRD submissions requirements, the 5 percent fee potential for that DR will be forfeited.

b. Personnel Certification (PWS 2.5 & DRD 875MA-009)

The objective of this schedule element is to emphasize the timely and proper certification and re-certification of personnel engaged in training responsibilities, processes and potentially hazardous operations. Of the schedule performance criterion, 20 percent of the total will be apportioned for the timely certification/re-certification of personnel. The S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) maintains a certification database and will be responsible for issuance of certification cards. The contractor is responsible for providing evidence upon the completion of required training.

**SUCCESSFUL PERFORMANCE (Element #2):** Successful performance of this schedule element is defined as the timely completion of required training, and providing the supporting evidence to QS10, such that certifications do not expire or lapse for contractor personnel. If, during the evaluation period, the contractor maintains the timely certification and re-certifications of personnel engaged in training responsibilities, processes, and potentially hazardous operations, the contractor will be entitled to the full 20 percent of the fee potential for

this schedule element. The maximum allowable defect rate (MADR) for the timely certification of personnel is zero occurrences of certification lapses or expirations. If the contractor fails, on one occurrence, to maintain the timely and proper certification of personnel, the 20 percent fee potential for this element will be forfeited.

c. Safety Compliance and Hazardous Operations Inspections (PWS 4.1 and 4.2)

The objective of this schedule element is to emphasize the timely safety compliance and hazardous operations inspections of MSFC facilities and of MSFC construction sites. Of the schedule performance criterion, 15 percent of the total will be apportioned for the timely safety compliance and hazardous operations inspections. The contractor is responsible for developing a comprehensive schedule of all MSFC facility inspections and submitting to the S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) for approval. The QS10 approved comprehensive schedule will serve as the baseline requirement for evaluation of the contractor's performance of this schedule element.

**SUCCESSFUL PERFORMANCE (Element #3):** Successful performance of this schedule element is defined as the timely performance of the safety compliance and hazardous operations inspections of MSFC facilities and of MSFC construction sites. If, during the evaluation period, the contractor performs the required inspections per the QS10 approved schedule, the contractor will be entitled to the full 15 percent of the fee potential for this schedule element. The maximum allowable defect rate (MADR) for the timely performance of scheduled inspections is 10 days. If the contractor fails and is behind schedule by more than 10 days, the following deductions in fee potential will apply:

Contractor Behind Schedule < 10 days = No Potential Fee Reduction  
Contractor Behind Schedule < 20 days = 5% Potential Fee Reduction  
Contractor Behind Schedule < 30 days = 10% Potential Fee Reduction  
Contractor Behind Schedule > 30 days = 15% Potential Fee Reduction

d. Real-time ALERT Availability (PWS 5.4.2)

The objective of this schedule element is to emphasize the timely distribution of ALERTS, generated through GIDEP or received from other Agency sources, to MSFC actionees. Of the schedule performance criterion, 10 percent of the total will be apportioned for the timely distribution of ALERTS. The S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) maintains and provides to the contractor a list of MSFC actionees for ALERTS. The contractor is responsible for entering ALERTS into the ALERT database and distribution of ALERTS to MSFC actionees for review and distribution. QS10 is responsible for monitoring the ALERT database to verify contractor's performance of this schedule element.

**SUCCESSFUL PERFORMANCE (Element #4):** Successful performance of this schedule element is defined as the timely database entry and distribution of ALERTS to MSFC actionees. If, during the evaluation period, the contractor enters and distributes all

ALERTS to MSFC actionees within two working days of receipt, the contractor will be entitled to the full 10 percent of the fee potential for this schedule element. The maximum allowable defect rate (MADR) for the timely distribution of ALERTS is two working days. If the contractor fails, on one occurrence, to enter and/or distribute ALERTS to the MSFC actionee list within the two working days, the 10 percent fee potential for this element will be forfeited.

e. Audit Action Item Status (PWS 6.2.8)

The objective of this schedule element is to emphasize the timely maintenance of an action item status system for S&MA participation in audits of MSFC internal organizations, MSFC vendors and suppliers, NASA Engineering and Quality Audits (NEQA), and other Government agencies. Of the schedule performance criterion, 10 percent of the total will be apportioned for the timely maintenance of the audit action item status tracking system. The S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) will monitor activity on the automated database to verify the contractor's performance of this schedule element. The contractor is responsible for maintaining status of all S&MA action items resulting from audits on the automated database.

**SUCCESSFUL PERFORMANCE (Element #5):** Successful performance of this schedule element is defined as the timely maintenance of the database of all S&MA audit actions. If, during the evaluation period, the contractor updates the database of audit action items on a periodic basis of at least monthly, the contractor will be entitled to the full 10 percent of the fee potential for this schedule element. The maximum allowable defect rate (MADR) for the timely maintenance of the database is 30 days. If the contractor fails, on one occurrence, to maintain/update the audit actions database within a 30 day period, the 10 percent fee potential for this element will be forfeited.

f. Recurrence Control Action Request (RCAR) Status (PWS 6.3.3 and MPG 1280.4))

The objective of this schedule element is to emphasize the timely generation of Recurrence Control Action Requests (RCARs). Of the schedule performance criterion, 10 percent of the total will be apportioned for the timely generation of RCARs. Hardware or software nonconformances, quality system deficiency notices, and quality comments may result in the generation of RCARs. The contractor is responsible for generating the RCAR for notification to the responsible organization(s). The S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) is responsible for monitoring the generation of RCARs to verify contractor's performance of this schedule element.

**SUCCESSFUL PERFORMANCE (Element #6):** Successful performance of this schedule element is defined as the timely generation of RCARs for notification to responsible organizations to investigate nonconformances. If, during the evaluation period, the contractor generates all required RCARs within five working days of receipt, the contractor will be entitled to the full 10 percent of the fee potential for this schedule element. The maximum allowable defect rate (MADR) for the timely generation of RCARs is five working days. If the

contractor fails, on one occurrence, to generate an RCAR within the five working days, the 10 percent fee potential for this element will be forfeited.

g. Safety and Environmental Inspections (PWS 2.3)

The objective of this schedule element is to emphasize the timely performance of safety and environmental inspections of employee worksites. Of the schedule performance criteria, 10 percent of the total will be apportioned for the timely performance of worksite inspections. The contractor is responsible for conducting, and recording the results of, safety and environmental worksite inspections at a rate of at least one per month per onsite contractor supervisor. The contractor is also responsible for providing a copy of the documented results of the worksite inspections the S&MA Safety, Reliability and Quality Assurance (SR&QA) Department (QS10) upon completion of the inspections.

**SUCCESSFUL PERFORMANCE (Element #7):** Successful performance of this schedule element is defined as the timely performance of safety and environmental worksite inspections. If, during the evaluation period, the contractor performs worksite inspections at a rate of at least one per month per onsite supervisor, the contractor will be entitled to the full 10 percent of the fee potential for this schedule element. The maximum allowable defect rate (MADR) for the timely performance of worksite inspections is 30 days. If the contractor fails, on one occurrence, to perform worksite inspections of at least one per month per supervisor, the 10 percent fee potential for this element will be forfeited.

2. Cost Performance

This criterion addresses the contractor's effectiveness in managing contract cost. The objective of the cost performance criterion is to emphasize effective management and control of contract cost. Of the potential fee available in this section, thirty percent (30%) is apportioned to the Cost Performance criterion.

**NOTE:** In order for the contractor to earn any fee for the cost performance criterion based upon this assessment, the total actual cost incurred for the period cannot exceed the total contract estimated cost for that period. The Government will review and take into consideration evidence submitted by the contractor of mission changes that had a cumulative and adverse affect on the actual cost incurred for which no equitable adjustment was provided to the contractor in accordance with contract Clause H.6 Special Provision for Contract Changes.

Cost performance is an annual assessment of the contractor's actual composite direct labor rate incurred (calculated at the fully burdened level) to the composite direct labor rate (fully burdened) negotiated for the contract evaluation period. The composite direct labor rate is fully burdened when it includes all fringe, overhead, indirect, and G&A allocations. Fully burdened costs for the purposes of this evaluation do not include any subcontract, inter-company work transfers, travel, or miscellaneous other direct costs (ODC). The following table depicts the negotiated fully burdened direct composite labor rates by contract period:

Period	Negotiated Composite Direct Labor Rate (CDLR)
Base Year	
Option Year 1	
Option Year 2	
Option Year 3	
Option Year 4	

A performance-based metric will be used to score the contractor's achievement of cost performance criteria. The metric will be the composite actual fully burdened labor rate, in comparison to the composite fully burdened negotiated labor rate for the contract period.

**SUCCESSFUL PERFORMANCE (Cost Criterion):** Successful performance of the cost performance criterion is defined by the effective management of the actual incurred, fully burdened, direct labor cost in comparison to the negotiated, fully burdened, direct labor rate. If, during the evaluation period, the contractor's cost performance results in an actual incurred rate that is 95 percent or less in comparison to the fully burdened direct labor negotiated for the contract, the contractor will be entitled to the full 30 percent of the fee potential for this cost performance criterion. The maximum allowable defect rate (MADR) for the cost performance criterion is an actual incurred rate that is .95 when compared to the negotiated direct labor cost rate. If the contractor fails to control the actual incurred direct labor cost rate and it exceeds the negotiated direct labor cost rate, the full 30 percent fee potential for this criterion will be forfeited.

The table below relates cost performance to the potential fee deductions that will apply above the MADR of 0.95:

Actual Incurred Rate (AIR) Divided By Negotiated Rate for the Period	Deduction in Potential Cost Performance Fee
< 0.95	0%
If $\geq 0.95$ but < 0.96	10%
If $\geq 0.96$ but < 0.97	20%
If $\geq 0.97$ but < 0.98	30%
If $\geq 0.98$ but < 0.99	40%
If $\geq 0.99$ but $\leq 1.0$	50%
> 1.0	100%

Annual determinations against the cost performance criterion will occur at completion of the base period and, as applicable, each option period of the contract (i.e. periods 2, 4, 6, 8, and 10).

3. Safety Lost Time Incident (LTI) Performance (PWS 2.3 and DRD 875SA-002)

This criterion addresses the contractor's effectiveness in reducing the occurrences of lost time incidents. The objective of the Safety/LTI performance criterion is to emphasize workplace safety. Of the potential fee available in this section, ten percent (10%) is apportioned to the Safety/LTI Performance criterion.

Lost Time Incident (LTI) data as defined by OSHA will be used to measure the effectiveness of the contractor's safety program. OSHA defines a "lost time case" as a nonfatal traumatic injury that causes any loss of time from work beyond the day or shift it occurred; or a nonfatal nontraumatic illness/disease that causes disability at any time.

**SUCCESSFUL PERFORMANCE (LTI Criterion):** Successful performance of the safety LTI criterion is defined as the absence of lost time cases. If, during the evaluation period, the contractor's safety LTI performance results in an actual incurred rate of zero lost time cases, the contractor will be entitled to the full 10 percent of the fee potential for this cost performance criterion. The maximum allowable defect rate (MADR) for the safety LTI performance criterion is zero actual occurrences. If the contractor incurs two or more LTI cases during the period, the 10 percent fee potential for this criterion will be forfeited.

The table below relates safety LTI performance to the potential fee deductions that will apply above the MADR of 0.0:

Number of LTI's	Deduction in Potential LTI Performance Fee
If LTI = 0	0%
If LTI = 1	50%
If LTI's $\geq 2$	100%

If the Government determines that any lost time incident was caused by conditions completely outside the control or responsibility of the contractor, that incident will be considered a non-event for the purposes of assessing the contractor's LTI performance under this criterion.

**NOTE:** If the contractor fails to report LTI(s) in accordance with this contract and DRD 875SA-002, notwithstanding the actual number of LTI(s) in the period, all potential fee for this criterion will be forfeited. In addition, the contractor's failure to report LTI(s) will be considered a significant weakness in the Management Performance criterion of Section A.

C. CONTRACTOR'S REPORTING REQUIREMENTS

The Contractor must submit a self assessment of performance under the criteria of this section (Section B Metrics Evaluation Plan) to the COTR on a Semiannual basis. DRD 875MA-003 provides the format requirements for submission of the quarterly report.”